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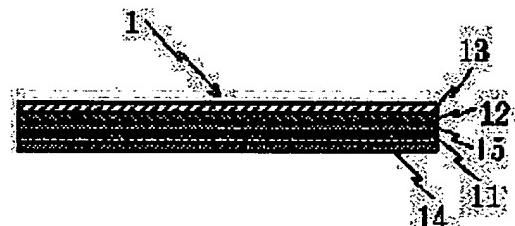
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(54) SHADING SHEET**(57)Abstract:**

PROBLEM TO BE SOLVED: To prepare a lightweight shading sheet having excellent shading effect and colorable to any desired color, this suitable as a material for tents or decorative curtains, by providing the upper surface of a base fabric with a surface layer via a shading layer while the opposite surface thereof with a reverse face layer.

SOLUTION: First, the surface of a plain- or twill-woven base fabric 11 consisting of a polyester or nylon is coated with a composition prepared by blending 100 pts.wt. of a polymeric material such as chlorosulfonated polyethylene with 5-30 pts.wt. of aluminum powder and 3-50 pts.wt. of a black-based colorant such as carbon black within a thickness of 12-200 μm by calendar topping or laminating process, thus forming a shading layer 12. Subsequently, the shading layer 12 is laminated with a composition prepared by blending 100 pts.wt. of a polymer similar to the above polymeric material with 5-80 pts.wt. of rutile-type titanium dioxide in a thickness of 50-200 μm to form a surface layer 13. Along with the above process, the opposite surface of the base fabric 11 is provided with a reverse face layer 14 by coating the opposite surface with an organic solvent solution of a polymer containing various functional additives such as a flameproofing agent by means of a doctor knife or roll coater, thus obtaining the objective shading sheet 1.

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CLAIMS

[Claim(s)]

[Claim 1] It is the protection-from-light nature sheet which are the protection-from-light nature sheet which has a base fabric, a protection-from-light layer, and a surface layer, and the laminating of the protection-from-light layer is carried out, it is formed on a base fabric at least with the macromolecule constituent containing aluminum powder and a black system coloring agent, the laminating of the surface layer is carried out on a protection-from-light layer, and it comes to form with a macromolecule constituent.

[Claim 2] The protection-from-light nature sheet according to claim 1 which is 3 - 50 weight section to the macromolecule 100 weight section in which the amount of the black system coloring agent which is 5 - 30 weight section and is contained in a protection-from-light layer forms a protection-from-light layer to the macromolecule 100 weight section in which the amount of the aluminum powder contained in a protection-from-light layer forms a protection-from-light layer.

[Claim 3] The protection-from-light nature sheet according to claim 1 or 2 whose thickness of a protection-from-light layer is 15-200 micrometers.

[Claim 4] A protection-from-light nature sheet claim 1 which is the layer in which a surface layer contains the rutile type titanium dioxide of 5 - 80 weight section to the giant-molecule 100 weight section which is 50-200 micrometers in thickness, and forms a surface layer - given in 3 any 1 terms.

[Claim 5] A protection-from-light nature sheet claim 1 which formed the above flesh-side surface layer in the field of the side which does not form the protection-from-light layer of a base fabric further - given in 4 any 1 terms

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DETAILED DESCRIPTION**[Detailed Description of the Invention]**

[0001]

[Field of the Invention] Especially, this invention relates to the protection-from-light nature sheet which can be colored the color of arbitration while having the protection-from-light nature suitable as materials, such as a tent of tentorium, which was lightweight and was excellent.

[0002]

[Description of the Prior Art] Generally sheets currently conventionally used for the tentorium tent etc., such as a rubber coated fabric and a vinyl chloride tarpaulin, are inferior to protection-from-light nature, and the light in tentorium especially leaks outside at Nighttime. The tentorium of fake wearing for example, of the tentorium which has such a tent etc. was unsuitable to use for an application which dislikes remarkably that the light in tentorium leaks outside at Nighttime.

[0003] The means proposed by JP,5-34093,A is known as a means for making it the light in the Nighttime tentorium not leak outside. This proposal is characterized by preparing a vinyl-chloride-resin coat in both sides of the base fabric which consists of a specific textile which adhered a black pigment and water repellent.

[0004]

[Problem(s) to be Solved by the Invention] In order that the above-mentioned JP,5-34093,A proposal might make a base fabric black, naturally it was what is demanded that the vinyl-chloride-resin coat formed in the both sides is a dark color. That is, when a vinyl-chloride-resin coat is made into light color, it is for the color of a base fabric being transparent and spoiling the tint. Of course, although it could prevent that the color of a base fabric might be transparent by thickening a vinyl-chloride-resin coat, it is not only especially inferior to workability, such as tentorium preparation, but in this case, the tent became heavy and protection-from-light nature was not able to say it with it being enough. On the other hand, although the problem that the color of a base fabric may be transparent does not arise even if it makes a vinyl-chloride-resin coat to some extent thin in the case where a vinyl-chloride-resin coat is made into a dark color, in order to obtain sufficient protection-from-light nature, it was what a certain amount of thickness is required as.

[0005] It is made in order to solve the above-mentioned technical problem, this invention is lightweight, and it aims at offering the sheet which has the extremely excellent protection-from-light nature, being able to color it the color of arbitration.

[0006]

[Means for Solving the Problem] The protection-from-light nature sheet of this invention made in order to solve the above-mentioned technical problem is the protection-from-light nature sheet which has a base fabric, a protection-from-light layer, and a surface layer at least, and it is characterized by a protection-from-light layer being formed on a base fabric with the constituent which a laminating is carried out and makes a subject the macromolecule containing aluminum powder and a black system coloring agent, and coming to form a surface layer on a protection-from-light layer with the constituent which a laminating is carried out and makes a macromolecule a subject.

[0007]

[Embodiment of the Invention] Hereafter, this invention is explained based on a drawing. Drawing 1 is the partial expanded sectional view showing one example of the protection-from-light nature sheet of this invention. For a base fabric and a sign 12, a protection-from-light layer and a sign 13 are [the sign 1 in drawing / the protection-from-light nature sheet of this invention, and a sign 11 / a flesh-side surface layer and the sign 15 of a surface layer and a sign 14] adhesives.

[0008] As a base fabric 11 of the protection-from-light nature sheet 1 of this invention Natural fibers, such as synthetic-fiber; cotton, such as polyester, a polyamide, a polyacrylonitrile, polyolefine, and polyvinyl alcohol, hemp, silk, and

wool; although the textile fabrics which consist of regenerated fibers, such as rayon, a staple fiber, and acetate, a nonwoven fabric, knitted fabric, etc. can be used It is fiber whose single-yarn fineness which consists of a polyamide, polyester, etc. is 70-250 deniers especially as an object for tentorium tents 30x302 (inch) Plain weave or the textile fabrics which carried out twill is suitable so that it may become dense.

[0009] The protection-from-light layer 12 is formed with a macromolecule constituent. As this macromolecule, specifically Natural rubber (NR), polyisoprene rubber (IR), Butadiene rubber (BR), a styrene butadiene rubber (SBR), isobutylene isoprene rubber (IIR), Ethylene-propylene rubber (EPM, EPDM), an ethylene-vinylacetate copolymer (EVA), Chloroprene rubber (CR), chlorosulfonated polyethylene (CSM), Chlorinated polyethylene (CPE), epichlorohydrin rubber (CHR, CHC), Nitrile rubber (NBR), nitril polyisoprene rubber (NIR), acrylic rubber (ACM), The rubber chosen from polyurethane rubber (U), polysulfide rubber (T), silicone rubber (Si), a fluororubber (FPM), etc., vinyl chloride system resin (PVC), polyurethane resin (PU), polyolefine system resin (PO), thermoplastic elastomer (TPE), etc. are mentioned. Of course, to these macromolecules, various additives, such as a vulcanization assistant, a vulcanization accelerator, an antioxidant, a bulking agent, processing aid, a softener, an antistatic agent, a plasticizer, a stabilizer, an antioxidant, and a coloring agent, can also be added if needed.

[0010] As an approach of carrying out the laminating of the protection-from-light layer 12 on a base fabric The calender topping method generally conventionally used as the manufacture approaches, such as a rubber coated fabric, Although you may be which approaches, such as an approach, a coating method, etc. which laminate the sheet produced beforehand using adhesives etc., in a coating method The manufacturing cost of the part and sheet with which obtaining the layer which has protection-from-light nature sufficient by one coating activity needs to carry out two coats several times that it is difficult and generally becomes high.

[0011] The greatest description of the protection-from-light nature sheet of this invention is in having made the macromolecule constituent which forms this protection-from-light layer 12 contain aluminum powder and a black system coloring agent. Namely, it the protection-from-light nature sheet of this invention not only presupposes that it is only black, but gives protection-from-light nature according to the synergism of aluminum powder and a black system coloring agent like the above-mentioned JP,5-34093,A proposal. The sheet which has protection-from-light nature sufficient also as a film by doing in this way as compared with the case where a protection-from-light layer is made only black is obtained.

[0012] Although you may be the aluminum powder itself which carried out grinding processing of the aluminum ground metal as aluminum powder added in the macromolecule constituent which forms the protection-from-light layer 12 and this aluminum powder may be made into the shape of a paste, in order to make homogeneity distribute aluminum powder in a macromolecule constituent for a short time, it is desirable to use what made aluminum powder the shape of a paste.

[0013] Although the amount of the aluminum powder added in the protection-from-light layer 12 changes with the color of the surface layer 13 mentioned later, thickness, etc., generally it is 5 - 15 weight section extent to the macromolecule 100 weight section which forms the protection-from-light layer 12.

[0014] It can be used even if the so-called carbon black etc. is any as a black system coloring agent, if used from before. Moreover, like the addition of aluminum powder, although the addition of this black system coloring agent changes with the color of a surface layer 13, thickness, etc., generally it is 3 - 50 weight section extent to the macromolecule 100 weight section which forms a protection-from-light layer.

[0015] Although it changes with the color of a surface layer 13, thickness, etc. also about the thickness of the protection-from-light layer 21, generally 15-200 micrometers is about 50-150 micrometers preferably. If the protection-from-light layer 12 is too thick, the trouble a manufacturing cost not only becomes high, but that the weight of the whole sheet becomes heavy will arise, and when the protection-from-light layer 12 is too thin, the protection-from-light nature as the whole sheet is inferior.

[0016] A surface layer 13 is formed with the same macromolecule as the protection-from-light layer 12, and can be colored arbitration. When making this surface layer 13 into light color, it is desirable to add the titanium oxide (TiO_2) of the rutile mold of 5 - 80 weight section to the giant-molecule 100 weight section which forms a surface layer 13. By adding the titanium oxide of a rutile mold to a surface layer 13, the color of the protection-from-light layer 12 is transparent, and it is hard to be visible, therefore a surface layer 13 can be comparatively made into a film. In addition, with the titanium oxide of an anatase mold, even if it is the same titanium oxide, since it is inferior to concealment nature, it is necessary to add a lot of titanium oxide.

[0017] The thickness of the addition of the aluminum powder added in the above-mentioned protection-from-light layer 12 and a black system coloring agent, the protection-from-light layer 12, and a surface layer 13 etc. should be selected also including conditions, such as a color of a surface layer 13. According to this invention person's knowledge, the

addition of the aluminum powder which makes a surface layer 13 white and is contained in the protection-from-light layer 12, and a black system coloring agent When it considers as the aluminum powder 10 weight section and the black system pigment 15 weight section to the macromolecule 100 weight section, If thickness of the protection-from-light layer 12 is not set to 100 micrometers or more, the sheet which has sufficient protection-from-light nature is not obtained, but when a surface layer 13 is made into dark green using the protection-from-light layer 12 which consists of the same presentation, the sheet which has protection-from-light nature sufficient also as about 50 micrometers is obtained in the protection-from-light layer 12. Namely, if the surface layer of the dark green which has higher protection-from-light nature as compared with white is formed In order to demonstrate protection-from-light nature by the protection-from-light layer 12 and the surface layer 13, and to be able to make the protection-from-light layer 12 thin, and for a white surface layer to be inferior to protection-from-light nature on the other hand and to demonstrate protection-from-light nature only by the protection-from-light layer 12 substantially, Even if it is independent [protection-from-light layer 12], only the thickness which can give sufficient protection-from-light nature is required. Moreover, it is the same as that of the above also about the addition of the aluminum powder added in the protection-from-light layer 12, and a black system coloring agent, and the thickness of a surface layer 13.

[0018] Moreover, in the protection-from-light nature sheet 1 of this invention, the thickness of the addition of the aluminum powder added in the protection-from-light layer 12 and a black system coloring agent, the protection-from-light layer 12, and a surface layer 13 etc. should be stopped by necessary minimum. It is because the weight of the protection-from-light nature sheet 1 will become heavy if it has a bad influence also on many physical properties of the protection-from-light nature sheet 1 -- it not only becomes cost quantity, but the protection-from-light layer 12 will become hard if there are too many additions of aluminum powder or a black system coloring agent -- and workability and the thickness of the protection-from-light layer 12 and a surface layer 13 is too thick.

[0019] The flesh-side surface layer 1 is formed in the field of the side which does not form the protection-from-light layer 12 of a base fabric 11 in the example shown in drawing 1. This flesh-side surface layer 14 is the protection-from-light layer 12 etc. and a layer formed from the same giant molecule, and is formed with the coating method by this example. Of course, although this flesh-side surface layer 14 can also be formed by the calender topping method etc., in order to stop the weight of the protection-from-light nature sheet 1 whole, forming with a coating method is desirable.

[0020] When forming the flesh-side surface layer 14 with a coating method, a base fabric 11 is coated with what dissolved a macromolecule and various additives in the organic solvent as usual with means, such as a doctor knife coating machine, a roll coater, and a flow coater. At this time, adhesion with a base fabric 11 improves by adding about 1 - 2% of the weight of an isocyanate system compound. Moreover, the amount of eyes at this time is 30 - 50 g/m² at solid content. Considering as extent is desirable.

[0021] To the giant-molecule constituent which forms this flesh-side surface layer 14, it is desirable to add titanium oxide. this titanium oxide is a rutile mold like what was added to the surface layer 13 -- desirable -- that addition -- the macromolecule 100 weight section -- receiving -- the 10 - 100 weight section -- it is 10 - 30 weight section still more preferably.

[0022] In this example, although the flesh-side surface layer 14 is used as the monolayer, it can also consider as a double layer. Moreover, it is not necessary to form the flesh-side surface layer 14. However, unless it forms the flesh-side surface layer 14, a base fabric will be exposed to the rear face of the protection-from-light nature sheet 1, and it is not desirable, in view of the viewpoint of waterproofness or the flame-resistance mentioned later.

[0023] When using the protection-from-light nature sheet 1 of this invention as a tent of tentorium, it is desirable to give flame-resistance. Grant of this flame-resistance is made by adding a suitable quantity of a flame retarder in the macromolecule constituent which forms one or more layers chosen from the protection-from-light layer 12, a surface layer 13, and the flesh-side surface layer 14. Of course, a flame retarder can also be added in adhesives 15. Although you may be which thing as this flame retarder as long as it is used conventionally, it is desirable especially to use together antimony system flame retarders, such as an antimony trioxide (Sb₂O₃), and fire-resistant plasticizers, such as tricresyl phosphate.

[0024] Surface treatment of the protection-from-light nature sheet 1 of this invention can also be carried out by various finishing agents, and it can also form a print pattern. Moreover, in manufacturing the protection-from-light nature sheet 1 of this invention, the dusting powder sprinkled in the case of manufacture of the conventional rubber coated fabric can also be sprinkled.

[0025]

[Example] Although a concrete example is given to below and this invention is further explained to a detail, this invention is not limited to the example shown below.

[0026] [Example 1] The laminating of the protection-from-light layer with a thickness of 120 micrometers which took

out with the calender the rubber constituent which applied elastomeric adhesive beforehand, and which consists of combination which shows a 210-denier polyamide fiber in Table 1 on the base fabric [45x452 (inch)] which comes to carry out plain weave a part rolled out, and obtained it in it was carried out.

[0027]

[Table 1]

CSM (high PARON; trade name) The 100 weight sections MgO (vulcanization assistant) Four weight sections TRA (vulcanization accelerator) Two weight sections Sb 2O3 (flame retarder) Ten weight sections TCP (fire-resistant plasticizer) Ten weight sections Calcium carbonate 50 weight sections Processing aid Three weight sections Aluminum powder (paste) *1 Ten weight sections Black system coloring agent (carbon black) 15 weight sections *1 Aluminum paste 2300H (trade name; Toyo Aluminium K.K. make)

[0028] Subsequently, the laminating of the surface layer with a thickness of 120 micrometers which took out with the calender the rubber constituent which consists of combination shown in Table 2 a part rolled out, and obtained it in it on the protection-from-light layer was carried out. Subsequently, dusting powder was made the front face, it vulcanized by the hot blast vulcanizing method, and the protection-from-light nature sheet was obtained.

[0029]

[Table 2]

CSM (high PARON; trade name) The 100 weight sections MgO (vulcanization assistant) Four weight sections TRA (vulcanization accelerator) Two weight sections Sb 2O3 (flame retarder) Ten weight sections TCP (fire-resistant plasticizer) Ten weight sections Calcium carbonate 50 weight sections Processing aid Three weight sections Rutile type titanium dioxide 30 weight sections [0030] When the obtained protection-from-light nature sheet was visually observed from the surface layer side, the color of a protection-from-light layer was transparent, and it was not visible. Moreover, the rate of protection from light at the time of the 100,000 lux exposure measured about the obtained protection-from-light nature sheet based on "JIS L 1055 A law" was 100%.

[0031] [Example 2] The protection-from-light nature sheet was obtained like the example 1 except coating with the paste of a CSM system the field of the side which does not form a protection-from-light layer, and forming a flesh-side (amount of eyes = 40g [of solid content/], and m²) surface layer in it. When the obtained protection-from-light nature sheet was visually observed from the surface layer side, the color of a protection-from-light layer was transparent, and it was not visible. Moreover, the rate of protection from light measured like the example 1 about the obtained protection-from-light nature sheet was 100%.

[0032] [Example 3] The laminating of the protection-from-light layer with a thickness of 80 micrometers which took out with the calender the rubber constituent which applied elastomeric adhesive beforehand, and which consists of combination which shows a 210-denier polyamide fiber in Table 1 on the base fabric [45x452 (inch)] which comes to carry out plain weave a part rolled out, and obtained it in it was carried out.

[0033] Subsequently, the laminating of the surface layer with a thickness of 80 micrometers which took out with the calender the rubber constituent which consists of combination shown in Table 3 a part rolled out, and obtained it in it on the protection-from-light layer was carried out. Subsequently, dusting powder was made the front face, it vulcanized by the hot blast vulcanizing method, and the protection-from-light nature sheet was obtained. When the obtained protection-from-light nature sheet was visually observed from the surface layer side, the color of a protection-from-light layer was transparent, and it was not visible. Moreover, the rate of protection from light measured like the example 1 about the obtained protection-from-light nature sheet was 100%.

[0034]

[Table 3]

CSM (high PARON; trade name) The 100 weight sections MgO (vulcanization assistant) Four weight sections TRA (vulcanization accelerator) Two weight sections Sb 2O3 (flame retarder) Ten weight sections TCP (fire-resistant plasticizer) Ten weight sections Calcium carbonate 50 weight sections Processing aid 3 weight section Rutile type titanium dioxide Five weight sections Carbon black Two weight sections Phtalo green Two weight sections Fe 2O3 Three weight sections [0035] [Example 1 of a comparison] The protection-from-light nature sheet was obtained like the example 2 except replacing with the combination which shows a protection-from-light layer in Table 4. Although the color of a protection-from-light layer was transparent and it was not visible when the obtained protection-from-light nature sheet was visually observed from the surface layer side, the rate of protection from light measured like the example 1 was 90%.

[0036]

[Table 4]

CSM (high PARON; trade name) The 100 weight sections MgO (vulcanization assistant) Four weight sections TRA

(vulcanization accelerator) Two weight sections Sb₂O₃ (flame retarder) Ten weight sections TCP (fire-resistant plasticizer) Ten weight sections Calcium carbonate 50 weight sections Processing aid Three weight sections Black system coloring agent (carbon black) 15 weight sections [0037] [Example 2 of a comparison] The protection-from-light nature sheet was obtained like the example 3 except replacing with the combination which shows a protection-from-light layer in Table 4. Although the color of a protection-from-light layer was transparent and it was not visible when the obtained protection-from-light nature sheet was visually observed from the surface layer side, the rate of protection from light measured like the example 1 was 90%.

[0038]

[Effect of the Invention] As mentioned above, since the protection-from-light nature beyond it can be demonstrated and the addition of a black system coloring agent can also be stopped even if it makes it thinner than the conventional protection-from-light layer made only black, when a protection-from-light layer uses together aluminum powder and a black system coloring agent, a protection-from-light layer does not become black beyond the need, but the effect of the protection-from-light nature sheet of this invention of the color on a surface layer also decreases, as explained in full detail. Therefore, not to mention demonstrating the protection-from-light nature superior to conventionally, the protection-from-light nature sheet of this invention can make thin a protection-from-light layer and a surface layer, and, moreover, can color a surface layer the color of arbitration.

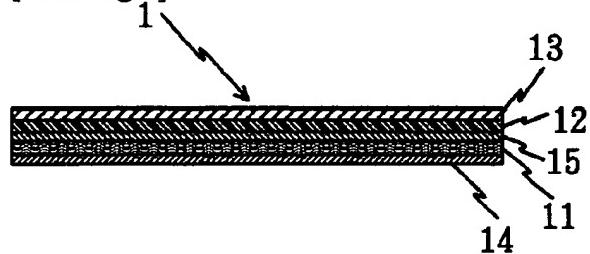
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DRAWINGS

[Drawing 1]

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